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ABSTRACT

This handbook provides guidelines for planning, implementing, and evaluating technology for the purpose of improving student achievement in school districts across Texas. These guidelines are not intended to replace currently successful district practices, but to provide one model of a step-by-step method for planning and implementation. The handbook does not describe what hardware to buy or which software is most effective. Background is provided in a discussion of state and local initiatives that resulted in the handbook. Planning for optimum results is discussed and includes general components of a plan and a review of local board approval. Other planning issues are reviewed, including research and development, maintenance and support, and competitive bidding. A checklist of planning points is given. Appendix A reviews state technology initiatives, and Appendix B lists 4 references and 15 resources for further information. (SLD)

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Handbook for Technology Planning in Texas Public Schools

Winter 1991

Advisory Committee for Technology Standards
and
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I
Introduction

Technology Can Improve Education

The Advisory Committee for Technology Standards, appointed by the State Board of Education, and the Texas Education Agency Office for Technology believe that technology, appropriately applied, can improve education. Further, as technology permeates society, concerns of relevancy demand that technology play a greater role in preparing students to assume productive and satisfying roles. Exciting innovations in technology and in the use of technology in education hold promise for increasingly significant and positive impact. In order for this promise to be realized, schools must change, and effective management of that change is essential for optimizing benefits.

The technologies encompassed in this handbook are computer-based systems; devices for storage and retrieval of massive amounts of information; telecommunication facilities for audio, video and information sharing; and other electronic media and interactive systems developed by the year 2000 that can assist in meeting the instructional and productivity needs of public school educators. This technology currently includes videodiscs and players, imaging devices, projection systems, CD-ROM discs and drives, software/courseware, modems, and distance learning equipment, as well as computer systems.

Purpose

The purpose of this handbook is to provide guidelines in planning, implementing and evaluating technology use for the purpose of improving student achievement for educators and officials in districts across Texas. These guidelines are intended as resources for districts that are developing locally appropriate strategies for planning and technology use. The Advisory Committee for Technology Standards encourages constructive feedback on the strategies contained in this document.

The Planning Process

While guidelines that follow are based on proven practices, these are not intended to replace currently successful district practices. In districts as diverse as those in Texas, there is certainly no single best paradigm. This guide provides one model of a step-by-step method for a successful district planning process for effective implementation of technology in instruction and administration. The planning approach employs a strategic perspective on vision and mission. This approach builds upon the growing knowledge base in planning, school leadership, staff development, technology tools and application, educational management, curriculum improvement, implementation of change, and program evaluation. Using this guide, you are encouraged to establish a framework, or blueprint, for the long-term coordination and use of technology.

Local Decision Making

This handbook does not describe what hardware to buy or which software/courseware is most effective in a learning situation. Individuals at the local level can best determine what is appropriate for the needs of their student population. There are no two school districts that use technology in exactly the same way. In fact, there are few schools within a single district that have identical programs.

District's Vision for Students

Although priorities vary from district to district and campus to campus, a common denominator present in all districts that are successfully implementing technology in their schools is a comprehensive plan that clearly states the district's vision for students and identifies steps in achieving that vision. Comprehensive planning shculd involve parents, community and business leaders, and district educators at all levels of responsibility. This handbook provides resources to assist school districts in effective planning.

II
Technology in Texas Schools

Philosophy

An educational system that prepares students for productive and satisfying roles in 21st century society must take advantage of an array of modern tools and techniques, including technology and technology use. Technology is one of many tools that must, in concert, support productivity of students, instructional and support staff, administrators, and school district officers in the areas of teaching, learning, administration, policy formulation, and communications.

Technology as a Supporting Tool

History

The 1980's will be remembered as the period when society was learning about computers. Educational resources were devoted to learning the theory and practice of how computers worked. Much technology-related activity in schools during the last decade arose from unarticulated grass-roots efforts by individual educators with modest resources. The promise of the computer stirred imaginations, but as an educational tool the machines lacked support from a majority of the educational community.

Learning About Computers

Approaching 2000

Technology as a Catalyst to Learning

The 1990's may be remembered as a period when students achieved learning with the assistance of computer-based and blended technology. Teachers began to see technology as a catalyst which promotes interest and curiosity and offers a much enlarged window to the universe. As the teacher's role changes to facilitator of learning, the prominence of the lecture fades. Research and accumulation of data is no longer overloading the mind with facts and information and transcribing those onto a piece of paper. With technology as a vehicle, research encourages access to and creation of information, discovery and exploration of relationships and concepts, use of information for deduction and decision making, and effective communications.

Long-Range Plan for Technology, 1988-2000

Visioning Technology's Role

The *Long-Range Plan for Technology of the Texas State Board of Education, 1988-2000*, published in 1988, outlined beliefs related to technology's role in the schools and articulated a vision in which technology facilitates the State Board's long-range goals for education in Texas. The plan focuses on classroom instruction, instructional management, distance learning, and communications. In each of three phases, the plan outlines major responsibilities of the state, regional education service centers, and local districts.

A Progress Report on the Long-Range Plan for Technology was published by the Texas Education Agency in May of 1991. This report includes results of a survey of technology in Texas school districts conducted by the TEA Office for Technology early in 1991. These documents are valuable resources and are available to district technology planners from the agency.

Summary of Technology-Related Legislative Action

Technology-Related Legislation

The 69th, 71st, and 72nd Texas Legislatures addressed the use of technology in Texas public schools, particularly in House Bill 1304 from the 69th session, Senate Bill 650 and Senate Bill 1 from the 71st session, and Senate Bill 351 and House Bill 2885 from the 72nd session. Details of the provisions of this legislation appear in Appendix A.

Technology Allotment

A key provision of the legislation is the establishment of a technology allotment beginning in 1992-93, providing dedicated state funding directly to districts for technology. The purpose of the allotment is to provide substantially equal access to instruction of high quality; to provide substantially equal access for teachers and administrators throughout the state to teching tools of high quality; and to improve student productivity. A major emphasis is placed on adequate and appropriate training for use of technology purchased through the allotment. There are restrictions on the use of the funds. At least 75% of the allotment is to be used to provide classroom instructional services and programs. Submission of a five-year technology plan and annual end-of-year expenditure reporting are required for districts to receive their allotment.

Long-Range Planning

The State Board of Education is charged with long-range planning for use of computing and technology-based systems for instruction, for the development of computer-related competencies in all students, and for the identification and distribution of information on emerging technologies.

Other Initiatives

Other major initiatives are discussed in *A Progress Report on The Long-Range Plan for Technology*. These initiatives include:

The Texas Center for Educational Technology

TCET

The Texas Center for Educational Technology (TCET) is a consortium of higher education institutions, business, and industry to develop and research innovative applications of existing and emerging technologies in the K-12 environment. The Center is located at the University of North Texas in Denton with the University of Texas at Austin currently participating as a second-site collaborator. The activities of the Center include research and development in the use of technology in education, in the application of new technologies in educational settings, in the creation of prototypes for the educational use of technology originally developed for commercial or other purposes, and in the use of various technologies to support handicapped students and teachers. Research and development labs and projects located at various sites promise to positively affect technology-based learning and teaching in Texas. The major categories of research being studied are teacher productivity, student learning, and learning strategies. School districts and educators can become members of TCET and receive information and other services from the Center.

The Texas Education Network

TENET

The Texas Education Network (TENET) provides telecommunications and related services to public school educators through an electronic network with resources that include on-line library catalogs, educational computer archives, public databases, and instructional multimedia libraries. A distributed computer system provides local access in 15 major metropolitan centers of the state and toll-free lines are available to educators located outside the local calling areas. The Texas Education Agency provides on-line time for the public school users. Training courses are available statewide for TENET users.

T-STAR

T-STAR

The integrated telecommunications system, named T-STAR, is a statewide network that serves Texas educators via one-way video/ two-way audio. T-STAR, to be operational in early 1992, will deliver TEA Video Programming from the agency's main building to Texas schools. The programming will include education news, professional development series, and teleconferences. Installed systems will enable districts to efficiently access a wealth of other remote educational resources. Activities on T-STAR can be effectively interwoven with workshops, conferences, and electronic services on the Texas Education Network (TENET) to create integrated packages for staff development.

Demonstration Pilots

Pilots

Technology demonstration pilots were established to examine the application and use of technology-based instructional delivery systems in the public school setting. These projects vary widely and include the application of technology to student learning, instructional delivery, and classroom management. Students, teachers, and parents participate in these pilot sites which are located on early childhood, elementary, middle, and high school campuses.

Public Education Information Management System

PEIMS

The Public Education Information Management System (PEIMS) combines, through a single process, the bulk of school district data collection into one authoritative database. This database of detailed information is intended to streamline reporting and provide a standard set of data for manipulation and use at all levels of the educational system.

Building and Educational Technology Assessment

BETA

Building and Educational Technology Assessment (BETA) is a state-wide inventory of facilities and technology in Texas schools. The inventory was conducted by architectural and engineering professionals with the assistance of high school students from

each school district. The data will be used for developing standards for school facilities and a financing formula for capital outlay and construction.

Software Advisory Committee

SAC

The responsibilities of the State Board of Education's Software Advisory Committee (SAC) include: implementing a system under which computer software is continuously evaluated; making recommendations to the State Board concerning computer software that should be approved and acquired; and cooperating with computer software designers and publishers in the development and distribution of appropriate software for use in the classroom. The committee recommended, and the State Board approved, that Texas join the States Consortium for Improving Software Selection, managed by Educational Products Information Exchange (EPIE) Institute. Through the membership, Texas received state licenses for EPIE's products which are *The Educational Software Selector (TESS) and The Latest and Best of TESS*. These databases are available to districts in a variety of formats through regional Education Service Centers.

Advisory Committee for Technology Standards

ACTS

The State Board of Education's Advisory Committee for Technology Standards (ACTS) examines possible educational approaches to, and standards for, the use of technology in schools. By legislative mandate, the ACTS committee was established to advise the State Board on standards or guidelines for the quality, technical specifications, functions, security, and other features of hardware, software, courseware, training, and other technology-related products and services provided to school districts. The committee views a standard as a national "target of quality" intended to ensure success while allowing and encouraging local initiatives. Each standard will be issued as a guideline for the first cycle to enable school districts time to review the proposed standards. These standards and guidelines will be accompanied by technical assistance handbooks to assist districts in applying standards for selection and acquisition of products of high quality.

State and Regional Agencies

Texas Education Agency

TEA

Office for Technology

The Texas Educaton Agency (TEA) is staff of the Texas State Board of Education and, as such, is the agency responsible for carrying out initiatives of the State Board. Furthermore, the agency is responsible for implementing legislation. The Office for Technology within TEA is charged with specific responsibility for technology in the schools. This office also promotes the use of technology as a tool to increase the equity, efficiency, and effectiveness of student learning, instructional management, staff development, and administration. This office is also responsible for providing leadership in the development of technology infrastructures, applications, and related services for the public school system.

The Office for Technology is responsible for establishing the essential elements for computing curriculum K-12; maintaining a process for the training and certification of teachers of that curriculum; planning, coordinating, and implementing activities and projects associated with the use of technology in instructional programs; and regulating distance learning programs and courses. It has the primary responsibility for administering the technology allotment, including review and evaluation of district technology plans. In addition, this office will assist districts in planning for the application of technology in instruction, administration, and communication by providing handbooks and training. Training will be provided through the regional Education Service Centers.

Current major initiatives include: developing and implementing a statewide electronic communications network (TENET); developing and implementing an integrated telecommunications system (T-STAR); establishing and implementing a Center for Educational Technology (TCET); managing demonstration programs regarding the use of technology in education (demonstration sites); and establishing standards for technology in education in the state (ACTS and SAC).

The office is also responsible for providing leadership in updating the State Board's *Long-Range Plan for Technology* and to report annual progress toward achieving the goals stated in the plan to the governor and leadership of the state. In addition, the coordination of statewide input of educators into the design and development of TEA video programming is under the auspices of this office. The programming encompasses educational news, technical information, and professional development.

The Department of Information Resources

DIR

The Department of Information Resources (DIR) is the agency charged with coordination of technology planning and implementation within state agencies. This agency reviews and evaluates, for example, technology initiatives of TEA, Health and Human Services, and other departments and agencies. Districts will submit technology plans to DIR as well as to TEA.

The General Services Commission

GSC

The General Services Commission (GSC) is responsible for purchasing for state government entities, including management of state purchasing contracts. School districts are permitted to buy educational technology products through state purchasing contracts.

Education Service Centers

ESC

The twenty regional Education Service Centers (ESCs) throughout the state provide leadership for innovation and school improvement, training, technical support, and other services to schools and educators within their service areas. Geographically distributed, these centers support a variety of regional technology-related services and provide a network for reaching schools with statewide efforts. Regional Education Service Centers are key entities in ensuring the successful implementation of technology in Texas schools.

III

Planning for Optimum Results

Scope of Planning Effort

Currently, districts and campuses are involved in several planning efforts. Examples of these planning efforts include: At-Risk; Discipline Management; Site-Based Management; and Campus Improvement. There is a strong state-level initiative aimed towards unifying these planning efforts into a comprehensive district plan. Planning efforts should be closely connected, consistent, and supportive of each other. The campus technology plans should flow naturally from the established district technology goals and objectives.

Coordinated Planning

Quality, Equity, Accountability: Long-Range Plan for Public Education, 1991-1995

Quality, Equity, Accountability: Long-Range Plan for Public Education, 1991-1995 of the Texas State Board of Education is a four-year plan that establishes a vision for education and contains the goals for education established by the 71st Texas Legislature. This document provides clear direction on actions that districts should initiate over the next four years and should be used in district technology planning.

Long-Range Plan for Education

Long-Range Plan for Technology, 1988-2000

Long-Range Plan for Technology

The *Long-Range Plan for Technology of the Texas State Board of Education* plots the course for meeting educational needs through technology and for implementing changes in education from 1988 to 2000. The outcomes envisioned through implementation of the plan include equity and quality in curriculum offerings, consistent and high-quality staff development, efficient communications, comprehensive use of technology in all appropriate areas of education, reduced teacher paperwork, and lower administrative costs. The document details actions and outcomes to be accomplished by the state, regional education service centers, districts, institutions of higher education, and the Texas Center for Educational Technology. These five areas include: hardware procurement and purchase; courseware adoption and provision; training and certification; delivery systems; and research and development.

The document may be used in district planning to provide:

- a vision for technology as a means for improving educational efforts;
- effective uses of educational technology;
- hardware procurement targets; and
- a long-term view of the integration of technology into the educational environment.

Technology: An Integral Part of Planning

Technology planning should be an integral part of district planning efforts and should not be done in isolation of other plans. The detail work on technology planning might be done by a subgroup of an overall district or campus planning effort. Technology should be addressed in all curriculum areas as well as special programs.

Technology Planning Efforts

Futurists have a tantalizing way of describing the year 2001 as though being there has little to do with getting there. The future simply arrives full blown. But it is the succession of days and years between now and then that will determine what life will be like. Decisions made and not made will shape the schools of tomorrow. (John Goodlad, A Place Called School)

Planning for technology is no accident ... and good planning usually results in achievements. Planning for technology use in schools is no different than planning for any other type of program. The selection of an appropriate district planning model may be dependent upon other planning models that are used within the district. If a district uses a model that is currently working, it should seriously consider that same model for technology planning.

Technology Definition

Technology

The technologies encompassed in this handbook are computer-based systems; devices for storage and retrieval of massive amounts of information; telecommunications facilities for audio, video and information sharing; and other electronic media and interactive systems devised by the year 2000 that can help meet the instructional and productivity needs of public educators.

Instructional Technology Definition

Instructional Technology

Instructional Technology means that the *primary* purpose of the activity or purchase of technology is to directly support classroom instruction. This definition includes: direct use with students for instruction; teacher classroom management activities, such as recording grades or preparing lesson materials and tests; and centralized instructional support, such as library-based systems for student and teacher use.

Administrative Technology

Administrative Technology Definition

Administrative technology means that the *primary* purpose of the activity or purchase is to support administrators as they manage the district's functions at either the campus or program level. This definition can include: access to budget and business management information, PEIMS data handling, student information management, communication within and outside the district, support services, public relations, personnel information, security, document and image processing, facilities development and management, and inventory.

Shared Decision Making

Collaborative Decision-Making Process

The benefits of shared decision making in the development of a technology plan are immense. Diversity in the planning process ensures better planning decisions for the entire education community. A collaborative process allows others to "buy-in" and create a plan which many will support. The power in the collaborative process is that the leader leads and manages by involving and empowering others. A collaborative process includes participation by a cross section of the school and community as representatives in the technology planning effort. According to House Bill 2885, *Each school district may create a Technology Council of persons from the public and private sectors to assist schools in the application and adaptation of technology.*

Purpose of Plan

The purpose of any plan is to achieve the greatest desired results with the least amount of effort. The technology planning should be undertaken with this in mind so that the local technology plan can have optimum impact upon students without undue hardship on those developing and implementing the plan. Documents which might be helpful in technology planning are the *Long-Range Plan for Technology of the Texas State Board of Education, 1988-2000* and the *Quality, Equity, Accountability: Texas State Board of Education Long-Range Plan for Public Education, 1991-1995.*

Strategic Planning Model

Strategic planning identifies outcomes based upon a shared vision of an ideal future. Leaders who use the strategic planning process create a common vision by involving and empowering others.

Shared Vision of an Ideal Future

Elements of the strategic planning process include:

- analyze the environment;
- create a common vision;
- develop goals;
- write and present a plan;
- implement the plan; and
- evaluate the plan.

Analyze the Environment

Some activities that might be involved in analyzing the environment include:

- identify the key players in decision making within the district and/or community;
- identify district/community/state/national trends; and
- identify areas where technology use would be appropriate.

Key decision makers should be strategically placed on the technology planning committee(s) and/or involved in the plan approval process. Consideration of trends assists in developing agreed-upon goals and procedures. Examples of current trends are shared decision making, site-based management, whole language instruction, and cooperative learning. Identifying initiatives within the district and the community which can effectively foster movement toward the shared vision through the application of technology is the heart of effective strategic planning for technology.

Step 1

Step 2

Create a Common Vision

It is critical that those who are involved in the technology planning process share a common vision about key skills for students who will be working in an information society and roles for teachers and administrators in facilitating the development of those skills. The planning committee should share a common vision of the potential of technology over the next five years. Documents which might be helpful in this area are *Quality, Equity, Accountability: Long-Range Plan for Public Education, 1991-1995* and the *Long-Range Plan for Technology of the Texas State Board of Education, 1988-2000.* Hardware and software manufacturers often provide videotapes and/or other electronic media which may also assist in providing images of future technological developments.

Step 3

Develop Goals

The next step is to develop goals. State and district goals as well as district/community needs may serve as guideposts for setting technology goals. In district planning, goals provide long-range directions for the entire school community.

Step 4

Write and Present the Plan

The planning document should be written and reviewed for final approval by the technology planning committee(s) and the local School Board. The pages in the document should be numbered sequentially for easy reference. Necessary revisions should be made prior to presentation of the plan to various groups within the school and community. Examples of groups which may be considered for presentations include community organizations, administrators, teachers, curriculum areas, parents, and other groups. Again, the technology plan may be a part of the overall district plan and not necessarily a separate plan.

Implement the Plan

Step 5

Action plans are then developed for the implementation of the goals and objectives. Generally, action plans with a specified timeline are developed around five major components: hardware; software/courseware; staff development/support; funding sources; and staff responsible for each action. Periodic progress reports on the implementation of the plan should be made to the school board and other groups.

Evaluate the Plan

Step 6

The evaluation process includes two different types of evaluation: formative and summative. The formative, or on-going evaluation, should be guided by the outcomes and timelines associated with the activities developed from objectives. Formative evaluation allows for mid-course adjustment during the implementation phase. The summative evaluation is conducted to assess the overall technology plan to determine if the technology effort is pursuant to the goals identified and is progressing in concert with the mission/philosophy statement of the district.

IV
Components of a Plan

After the concepts and strategies of planning are established, the planning group should follow an outline of planning components to ensure that all parts receive proper attention. Good technology planning methods commonly contain some form or variations of the following elements:

Components of a Plan

- Mission/Philosophy Statement;
- Goals and Objectives;
- Action Plans; and
- Evaluation Process.

Mission/Philosophy Statement

Mission/ Philosophy Statement

Before detailed and specific planning is undertaken, it is important that a set of beliefs and purposes be set forth establishing a mission and/or philosophy for guiding the use of instructional and administrative technology in the district. This mission/philosophy should be consistent with the general educational philosophy of the district.

Vision of Technology's Role

The mission/philosophy statement provides a basis from which goals, objectives, and action plans can be developed. Developing a mission statement ensures consistency of purpose and direction in technology-related efforts. The mission/philosophy statement may be descriptive of the overall vision of technology's role in the district, how technology may improve education, and reasons why technology is important to the district. Philosophy statements are designed to give long-term guidance to the planning process while providing short-term flexibility in regard to the application and use of technology. Any revision of the philosophy statement would reflect a major change in district direction and should merit careful consideration.

Goals and Objectives

Goals

Goals are statements that indicate some general performance or accomplishment over a period of time. In district planning, goals provide long-range directions for the entire school community. Goals should be prioritized to maximize efficiency of program implementation. These goals define what technology use in the district will look like at some point(s) in the future. Descriptions or scenarios of what students/teachers/administrators may be doing may also be helpful in describing goals. Each goal provides a focal point around which action planning for specific initiatives can take place.

Goals should be consistent with the district statement of philosophy and reflective of broad-based participation in the development process. Two approaches lead to establishment of goals. One involves examining shortcomings of existing programs, and the other involves defining targets of excellence.

The planning committee(s) should also refine goals into objectives. Objectives are specific, measurable ways to meet goals.

Objectives should be reviewed and revised annually based on district progress through the year and on changes in educational uses of technology. These objectives provide the next level of specificity and commonly focus on a particular program, population, or application of technology.

Objectives

Action Plans

Implementation of a technology plan is neither easy nor is it immediately accomplished. A gradual yet definitive process is most desirable. There should be room for flexibility. As technology changes, so will certain aspects in the use of technology. Action plans should detail the action to take place, the time frame for action, resources required, and person(s) responsible for the action. Action plans should be driven by purpose and related to hardware, software/courseware, staff development and evaluation. The purpose, or program intent, should determine both the hardware and software selection.

Implementation

Keeping in mind the vision, pnilosophy, and goals at both the district and campus levels, the implementation process includes the following:

1. Identifying and prioritizing student, teacher and/or administrative needs;
2. Describing how the technology application will impact the identified instructional and/or administrative needs;
3. Identifying the students and/or staff who will benefit from the implementation of the technology;
4. Describing the student/teacher/administrative behaviors that may be observed during and after the application of technology;
5. Providing a timeline with the necessary activities and person(s) responsible for the implementation; and
6. Describing how the implementation ensures all students/ staff equitable access within their K-12 experience.

Action Plan Components

The implementation activities are developed around four major components:

- Software/Courseware;
- Hardware;
- Staff Development/Support; and
- Evaluation of the Implementation.

Software/Courseware

Decisions should also be made on the software/courseware to be used. Is there an effort to integrate the technology into the curriculum? Is there congruence among the software/courseware selection, hardware selection, the program intent, and site priorities? Will the software/courseware need to be purchased? Who is responsible for the purchase? In what time frame will the software/courseware be purchased? What is the cost of the software?

Hardware

Decisions must be made about what hardware is to be used for the implementation. Will existing hardware be used or must it be purchased? If existing hardware will be used, will it need to be rearranged or upgraded to accomplish the application? If the hardware is to be purchased, when will it be delivered and operational? Is a bid required? Will facilities need to be modified? Who is responsible for setting up the hardware? In what time frame will the hardware activities be accomplished? What are the costs involved? What are the sources of funding?

Staff Development/Support

The third area of implementation activities is related to training and support. The same kind of decisions must also be made. What training will be necessary? Who is responsible for the training? How long will the training be? In what time frame will the training be offered? How will staff be given time to attend? When will staff have access to technology in order to apply the training? What will be the cost of the training?

Evaluation

The final area of implementation activities revolves around assessment and evaluation of the implementation. Again, decisions must be made related as to who will be responsible, in what time frame will the assessment occur, what data will be collected, what will be done with the assessment, and what will be the costs involved in the evaluation?

The evaluation process should include teacher input, student achievement data, community input, and other forms of data considered important by the campus team to assess specific programs. On-going data can provide program trends which can be useful to the team in projecting outcomes. The final product should reflect an assessment of the program's effectiveness in maximizing student learning.

Districts should use campus evaluation data in order to compare results to the stated objectives. Results should be used to plan updates or revisions for correcting inadequacies in the former planning process as soon as possible. Evaluation and revision are on-going processes.

Technology Budgets

Technology Budgets

Budgets for technology implementation should include the financing for the effective implementation of the technology plan. Effective implementation of technology requires expenditures to be made in the following areas: hardware, software/courseware, materials/supplies, staff development, personnel support, and other areas such as maintenance and facilities. By creating budgets which consider all components, the district will have a higher degree of success with its implementation. Budgets for financing technology implementations may come from several sources: federal money (Chapter monies or grants); state money (Chapter, ESL/Bilingual, Special Education, Gifted, Vocational, grants, or technology allotment); and local money (local tax dollars or business partnerships or gifts). With each goal and technology

application, the district should consider the sources of revenue for each area of hardware, software/courseware, materials/supplies, staff development, personnel support and other services. When all areas are included in the budgeting, implementation of fewer objectives within a given year may seem appropriate.

Evaluation of the Planning Process

Review and Adjust Process and Plan

The process of technology planning must be evaluated and fine-tuned like any other process. It is important that a district step back and examine its process for technology planning to see that the design of the process aligns with other priorities within the district, to ensure that the design is faithfully executed, and to assess the effectiveness of the process.

For example, a district strategic planning model which results in centrally specified applications at campuses may need to be modified as the district moves to site-based decision making and elements of site-based management. Without review of the process, technology planning may become out of step with overall district efforts. Committees need fresh ideas to maintain effectiveness, and restaffing and restructuring of planning may be appropriate from time to time. Attention should be given to intended outcomes of the technology planning effort, and a district should periodically assess progress toward those outcomes. Evaluation is essential to ensure that the technology planning effort remain dynamic, appropriate, and effective.

V
Local Board Approval of Plan

Local Board Support

After the district's long-range plan for technology has been completed by the committee, the next appropriate step is to present the plan to the local board of education for approval. Some districts may first choose to present the plan to a subcommittee of the board that has been chosen to concentrate on technology for the district. This subcommittee could then evaluate the plan and act as a bridge between the committee and the full board. By previewing the plan before presentation to the full board and the public, many questions can be answered ahead of time, and surprises can be kept at a minimum. After the plan has been presented to the subcommittee, it may be advantageous to give each board member a copy in advance of the scheduled meeting. This gives board members enough time to raise any questions they may have and members of the committee an opportunity to answer these questions before the general meeting.

Once the plan has been approved by the board, it should be printed for wide dissemination to all campuses, to all interested persons in the community, and to all administrators who will be involved with implementation of the plan. An organized "roll out" or "kickoff" of the plan may provide appropriate publicity.

VI
Other Planning Issues

There are many other issues which districts need to consider in long-range technology planning. These issues can have a significant impact on overall plan success, and districts need to be sure they evaluate the potential effect which any one of these issues can have on the effectiveness of technology planning and use.

Research and Development

Exploring New Possibilities

The areas of research and development are often overlooked or ignored by school districts for various reasons. Yet, this is one of the most important facets of technology planning. One of the ways the state supports research and development is through pilot projects. School districts are encouraged to set up appropriate pilots for their individual needs. In addition, the technology allotment established by Senate Bill 1 specifically addresses the research and development of emerging instructional technology applications.

Partnerships

Community Involvement

Partnerships between schools, community, business, higher educational institutions, the Texas Center for Educational Technology, regional Education Service Centers, and other groups associated with schools are encouraged. Districts need to be aware, however, that partnerships are not the panacea for all ills. These cooperative efforts must be entered into with foresight, planning, and genuine involvement and commitment of all the parties. Effective group process is necessary to avoid one group dominating activities of the partnership.

Facilities Planning

Plan for Present and Future Needs

Much thought should be given to what a site will need in order to be adequately prepared for technology. Administrative personnel, district engineers, and community resources such as local telephone, cable, and TV companies/contractors should be consulted in coordination with the architects for new construction and remodeling. Consideration must be given to adequate wiring and cabling for telecommunications. This helps ensure that each site will have adequate equipment for present and future technological needs. Facility needs are among the leading inhibitors to effective and timely implementation of technology.

Classroom Layout

Consider Traffic Flow of Students

The size and arrangement of the room are necessary considerations when planning. Rooms should be large enough to accommodate not only the number of computers that will be housed there, but also peripherals, furniture, and people. In the event that the room will serve as a networked lab, enough space must be available for cables, file server, and peripherals. It is easy to overlook the fact that students must be able to sit and move around without bumping into equipment or each other.

Electrical Needs

Grounded and Protected Power

Care should be taken to make sure that the proper number of outlets providing enough amperage are available to run all the equipment. It is recommended that a certified electrician be enlisted to assist. All equipment purchased should be UL- and FCC-approved and have the volt and amp readings listed on the outside of the cases. Electrical lines should be dedicated for computer equipment only. Surge protected circuits and isolated grounds are recommended.

Furniture

Adequate Workspace

As with hardware and software, furniture selection should be driven by purpose. For most schools, computer tables with cable catchers are an appropriate type of equipment. Generally, chairs should be selected according to the students' average body weight and height. If countertops are used in labs, care should be taken that the height is appropriate for students. Desk or table-top workspace should also be considered to accommodate peripherals as well as books and materials of students and teachers.

Security

Access to Equipment

Labs and rooms that contain technology equipment should be secured in such a way that the equipment is safe. Break-in resistant doors and windows, deadbolt locks, hidden cameras, and motion detectors can be used to enhance security. Districts may also wish to consider who should have access to equipment.

Other Considerations

Storage and Other Concerns

Teaching with technology brings a host of other issues to consider. Dry marker boards should be installed since chalk dust can damage computer equipment. Proper placement of screens, electrical receptacles, adequate and controllable lighting, and corkboard or tackable wall surfaces should be considered. In addition, some thought must be given to storage of disks, books, videotapes, electronic equipment, and teacher aids. Environmental concerns such as air conditioning, ventilation, noise level, humidity, radiation, and static discharge should be addressed.

Technology Inventory Process

Inventory Decisions

There are various opinions on what to inventory and to what extent it should be done. Inventory should be kept on hardware. While some districts do not inventory software, many districts list software in their library holdings. Many teachers find it helpful to know what software is available on their campus or districtwide. The decision as to what to inventory must be an individual district decision. In general, if the item can be considered capital outlay, it should be inventoried. There are now many inventory aids such as bar coding, which can facilitate this process. Time and personnel will probably be the factors that guide each district's decision.

Sources of Technology Plan Development

Every Plan Should Be Unique

There are many sources to tap when developing a district technology plan. Every plan should be unique and seek to meet the needs of the individual district's learners. The final plan should address all the areas that the district serves. That means some schools will write their plans for Pre-K through 12, while some will include special programs, community education programs, and pre-school programs. Teachers, administrators, community leaders and students all should be involved with the planning process.

Agencies

Planning Assistance

Sources that districts access for technology planning assistance include TEA, regional Education Service Centers, TCET, and DIR. These agencies will be aware of other groups which may be able to assist in the development of technology plans.

Consultants

Avoid Vendor-Specific Plans

Sometimes districts use independent consultants to assist in the development of their technology plans. Their areas of expertise are usually in strategic planning and facilitating group interactions. Some vendors also provide consulting services. Districts must fully participate in technology planning to ensure that it is the district's interests that are served.

Professional Organizations

Technology Groups

Technology groups and organizations are sources for planning assistance. Some examples of these professional organizations are: Texas Computer Education Association, Texas Association for Educational Technology, Texas Association of School Boards, and National School Board Association. Other sources include teacher associations, subject area professional groups, and higher education entities.

Maintenance and Support

Allocate funds for maintenance

Maintenance and upkeep of hardware and software are important concerns. Districts must allocate funds to keep their equipment running and software free of problems.

Software

Software Support

Districts can contract with distributors or individuals, sign agreements with vendors, or train in-house personnel to provide software support. Software agreements vary from vendor to vendor. In cases where districts have integrated learning systems (ILS), the contracts signed between districts and vendors often include upkeep, maintenance, staff development, and support of software. Districts should be aware of possible long-term costs related to software support for integrated learning systems.

Maintenance Agreements

Hardware

There are several ways to care for hardware. A district may employ their own technicians to care for all their equipment. Other ways are for districts to contract with an outside agency or purchase maintenance agreements. Districts may wish to use bonded companies for such agreements. Some districts use a combination of these methods.

Technology Obsolescence Issues

Limited Lifetime

Hardware/Software Life Cycles

Technology has a limited lifetime. Districts should allocate monies for replacement, recycling, upgrades, and disposal of hardware and software as part of the budget process.

Explore Other Uses

Recycling

Equipment such as computers and printers have a lifetime of five to seven years. However, this does not mean that this equipment cannot be used in other ways or areas. Some ways of using older equipment are to distribute them to teachers and administrators, put them on wheels for checkout purposes, network computers and printers, or use them for staff development. Software can be recycled by putting the individual copies with the stations on wheels and/or moving the software to classrooms where it is applicable. It may even be checked-out for home use where districts support a take-home program. Districts need to consider the cost to maintain and support older hardware and software, and they must ensure that reallocations will provide quality experiences.

Keeping Current

Upgrades

An option to take with outdated hardware and software is to upgrade it. Upgrading software may require hardware upgrades. Software upgrades could create incompatibility or file conversion problems. It is also possible that an upgrade of equipment could

lead to incompatibility with other equipment. Therefore, districts should consider running a test with the equipment they plan to upgrade before committing funds to these projects.

Check for Compatability

Disposal

There comes a time when a district can no longer use certain technologies. It may not be cost effective to keep, or parts may no longer be available. Software may be obsolete or no longer be an effective way to teach the material. In such cases, disposal of the equipment or software is the best solution.

Software and/or Equipment May Be Obsolete

Gifts

Districts need to be aware that sometimes a gift can be very costly. For example, hardware may be obsolete or need to be upgraded in order to be used. Hardware may not be compatible with existing equipment. Software may be a different version than that currently being used or may have been illegally copied, thus placing the district in jeopardy. It is possible that software which is given may contain bugs or viruses which could cause many hours of down-time and be very frustrating. Gifts of hardware and/or software may also require additional staff support or changes in curriculum direction. Districts should establish guidelines for accepting gifts of technology. Districts may also want to avoid assigning dollar values for tax purposes.

Watch for Bugs, Viruses, or Inappropriate Donations

Licensing Agreements

Some software companies have licensing agreements which districts can take advantage of to reduce their cost. It generally is to a district's advantage to call the company or talk to the local representative about the possibility of different kinds of licenses, including district, site, and lab or classroom licenses.

Software Licensing

Copyright and Ethics

Positive Modelling

Technology includes many forms of media and storage devices as well as software programs. It is important to remember that ethically, as well as legally, school districts and personnel are responsible for following the copyright laws. Most software packages are sold with the copyright clearly stated. Some software is sold as shareware or donationware. It is expected that these last types of software will be paid for if the software is used. Items such as tapes, movies, CD audio disks, and documentation for software programs fall under the copyright umbrella. It is the district's responsibility to set the kind of example that they expect their students to follow. Districts should have a board-approved copyright policy. The International Society for Technology in Education (ISTE) has guidelines for copyright policies.

Competitive Bidding Process

Bidding Requirements

Statutes containing school district requirements for competitive bidding are found in the Texas Education Code, Local Government Code, and Vernon's Civil Statutes. *The Handbook on Competitive Bidding for Texas Public Schools* organizes the many bidding requirements into sections that follow the sequence of procedures in the competitive bidding process. It may be obtained from TEA. Each section in the handbook begins with the controlling statutes, followed by explanations and interpretations which provide guidance regarding the types of business transactions to which the requirements of the competitive bidding law apply.

VII
Technology Planning Checkpoints

The following checkpoints are a guide to ensure that these key components were considered in your planning process. You may wish to check off items, indicate page numbers in your plan, or person(s) responsible. If your district currently has a technology plan, these checkpoints should assist in updating your plan:

PLANNING

____ Did you use a collaborative method for planning?

____ Did you include a cross-section of the school and community on your planning team?

____ Did key decision makers play a role in developing your plan?

____ Did your planning include a review of different kinds of educational technology available?

____ Did you use disaggregated achievement information in developing your plan?

____ Does your plan cover the five-year period from 1992-1997?

____ Do you have procedures in place for continuation of the planning process?

___ Do you have procedures in place for reporting on the allotment fund uses?

MISSION

____ Did you review the mission or purpose for technology in the state as outlined in the *Long-Range Plan for Technology of the Texas State Board of Education, 1988-2000*?

____ Did you establish/review the mission or purpose for technology in your district?

____ Does your district plan to use technology to increase achievement and close the equity gap between ethnic populations of the district?

GOALS

____ Does your plan have a relationship to other planning efforts of the district?

____ Does your technology plan support the district's long-range goals for education?

____ Does your plan address technology in all curriculum areas by 1997?

____ Does your plan address technology in all special programs by 1997?

____ Does your plan identify the key skills for students working in an information society?

____ Does your plan provide for keyboarding and age-appropriate computer-related competencies in grades K-6?

____ Does your plan provide opportunities for students to use those competencies following instruction?

____ Does your plan provide for computer literacy requirements in the middle school grades?

____ Does your plan provide for technology/computer-related courses at the high school level?

____ Does your plan identify student, teacher, and administrative needs that technology can address?

____ Does your plan ensure all students and staff equitable access to technology?

____ Does your plan provide for the training and staff development necessary to effectively use the technology?

PLAN OF ACTION

SOFTWARE/COURSEWARE

____ Have you provided ways to determine what software/courseware will be used to support the purpose of technology in your district?

____ Have you considered the relationship of instructional and administrative software?

____ Does it require personnel support to function correctly?

____ Have you considered additional equipment needed to support software, such as modems and phone lines?

____ Is there congruence among the software/courseware selection, hardware selection, program intent, and site priorities?

____ Have you decided what software/courseware will need to be purchased and who will be responsible for the purchase?

____ Have you considered district and/or site licenses and networks versus stand-alone software?

____ Have you considered the initial and continuing (upgrading) cost of software/ courseware and sources of funding?

____ Have you planned for training/staff development to support the software/ courseware?

HARDWARE

____ Have you determined what hardware will be used for implementation?

____ Have you determined if existing hardware will be used? If so, will it need to be rearranged, expanded, or upgraded?

____ Have you decided who will be responsible if hardware needs to be purchased?

____ How will hardware be purchased? (cooperative bidding with ESC, state bid, etc.)

____ Did you consider overhead projection devices?

____ Have you determined who is responsible for setting up the hardware and what time frame is necessary?

____ Have you provided for the maintenance and support of the hardware?

____ Are the facilities adequately wired to support the hardware?

____ Have you considered the initial, continuing, and upgrading costs relating to hardware?

FACILITIES

____ Did you determine if facilities need to be modified? If so, who will be responsible for the modifications?

____ Did you plan for adequate electrical power?

____ Did you plan for electrical grounds and surge protectors?

____ Did you plan for phone lines and cables if needed for present or future telecommunication needs?

____ Did you plan for adequate furniture and equipment for computers and peripherals?

____ Did you plan for security requirements?

____ Did you plan for environmental concerns such as air conditioning, ventilation, noise level, humidity, radiation, and static discharge?

____ Did you plan for adequate and adjustable lighting?

____ Did your plan include technology requirements, including phone lines and telecommunication cables, in long-range facilities planning?

EVALUATION

____ Did you provide for ongoing assessment, revision, and evaluation of the implementation?

____ Did you establish who is responsible for evaluation activities?

____ Did you determine what data will be collected, what will be done with the analysis, and what costs will be involved?

____ Did you plan for student achievement data, teacher input, and community input?

____ Did you plan for updates or revision procedures to accommodate mid-course adjustments?

____ Did you establish an evaluation process for staff development effectiveness?

____ Did you provide for students, staff, and others to evaluate your technology programs?

BUDGETING

____ Did you plan for maintenance costs in your budget?

____ Did you consider the additional cost of electricity for hardware and air conditioning?

____ Did you consider cost of supplies and materials, such as computer paper, blank disks, printer ribbons, and disk storage?

____ Did you consider initial and ongoing networking costs? (installation, cabling, maintenance, technical support, administrative aide, etc.)

____ Did you consider cost of computer furniture, dry marker boards, and other materials?

____ Did you budget for training and staff development?

____ Did you include a repair/replacement cycle in the budget for hardware and software?

____ Did you calculate projected total technology allotment expenditures?

____ Did you calculate what percentage of the allotment was spent on instruction?

____ Did you calculate your estimated TOTAL district technology expenditures?

____ Did you calculate what percentage your allotment is of your total district technology expenditures?

STAFF DEVELOPMENT/ SUPPORT

____ Have you identified at least one person in your district who is responsible for instructional technology planning and implementation?

____ Do you have adequate, well-trained staff for courses offered in middle and high school?

____ Do you have adequate, well-trained staff for keyboarding instruction and other computer-related skills for elementary students?

____ Have you made provisions for staff development in these areas?

____ Have you determined what hardware training will be necessary to implement your plan?

____ Have you determined what software training will be necessary?

____ Have you determined how teachers will receive assistance with the integration of technology into their curriculum?

____ Have you planned for technology training to assist administrators in being more effective/efficient instructional leaders?

____ Have you determined training needs of support staff and paraprofessionals?

____ Have you established who is responsible for training?

____ Have you weighed individual needs against district-wide software licenses for the purpose of training, support, and possible file exchange?

____ Have you made provisions to ensure full participation of all staff members?

____ Have you made provisions to ensure access to technology immediately following training?

____ Have you determined when and how follow-up training will be provided?

____ Have you included training/orientation provisions for teachers and others new to the district each year?

____ Have you considered how you will evaluate the training?

APPENDIX A:

State Initiatives

State Initiatives Which Directly Affect Educational Technology

Texas Education Code Section 14.061

The purpose of this subchapter is to:

(1) provide substantially equal access for students throughout the state to instruction of high quality, to all required courses of study, and to information resources providing enrichment through the application of computers and other emerging technology;

Purpose

(2) provide substantially equal access for teachers and administrators throughout the state to teaching tools of high quality, to efficient management systems, and to instruction in using technology in the classroom enabling teachers to accomplish their daily tasks more quickly and efficiently, particularly in areas such as parent communication, curriculum planning, and interschool networking; and

Equal Access

(3) improve student productivity throughout the state.

Improve Student productivity

TEC Sec. 14.063

FUND ADMINISTRATION; TECHNOLOGY ALLOTMENT

Administration

(a) The Central Education Agency shall administer the technology fund and shall make annual disbursements from the technology fund.

Amounts

(b) Each school district is entitled to an annual allotment for the purposes provided under Section 14.064 of this code equal to its unadjusted average daily attendance multiplied by:

(1) $30 for the 1992-1993 school year, or a greater amount provided by appropriation;

(2) $35 for the 1993-1994 school year, or a greater amount provided by appropriation;

(3) $40 for the 1994-1995 school year, or a greater amount provided by appropriation;

(4) $45 for the 1995-1996 school year, or a greater amount provided by appropriation;

(5) $50 for the 1996-1997 school year and for each school year thereafter, or a greater amount provided by appropriation;

Rules

(c) The State Board of Education shall establish rules for the administration of this section. The rules shall provide that the equipment purchased shall meet the standards established under this chapter.

TEC Sec. 14.064
USE OF ALLOTMENT

A district's allotment under Section 14.063 of this code may be used only for:

(1) the acquisition of technological equipment and related services, including hardware, software, courseware, training, subscription fees for telecommunications and data base services, and other related services for the purposes of this subchapter;

Data Base Services

(2) the procurement of an electronic on-line catalog circulation system, CD-ROM, or other emerging technology for each school library;

(3) the provision for electronic access to regional, statewide, national, and international resources;

World-Wide Resources

(4) the acquisition of telecommunications equipment in classrooms for data base applications; and

(5) the research and development of emerging instructional technology.

The Central Education Agency shall monitor the use of each district's allotment to ensure that at least 75 percent of the allotment is used to provide classroom instructional services and programs.

75% Used to Provide Classroom Instruction

TEC Section 14.065

Five-Year Plan

To be eligible for an allotment under this chapter, a school district shall file with the Central Education Agency and with the Department of Information Resources a five-year plan for the use of a technology allotment. Each year the district uses a technology allotment, the district shall report to the agency how the use of the allotment relates to the training of the district's personnel using the technology and to the five-year plan or to a proposed plan to train personnel.

TEC Section 16.052(b)

Staff Development in Technology

(b) Each school district must provide for not less than **20 hours** of staff development training under guidelines provided by the commissioner of education. The training provided must include technology training and must occur during regular hours of required teacher service. On the request of a teacher, a school district may credit the teacher compensatory time to be applied toward the number of training hours required under this subsection for workshops, conferences, or other professional training that the teacher has attended.

TEC Section 16.150

Foundation School Program

(a) Developmental and technology allotment allocations under the provisions of Chapter 14 are included in the Foundation School Program.

(b) Each district shall be allotted the amount specified in Section 14.063 of this code after deductions by the commissioner of education for the purposes of financing programs authorized under Subchapter C, Chapter 14, of this code.

TEC Section 21.931(a)

Site-based Decision Making

(a) Each school district shall develop and implement a plan for site-based decision making not later than September 1, 1992. Each district shall submit its plan to the commissioner of education for approval.

(b) Each district's plan:

(1) shall establish school committees;

School Committees

(2) may expand on the process established by the district under Section 21.7532 of this code for the establishment of campus performance objectives; and

(3) shall outline the role of the school committees regarding decision making related to goal setting, curriculum, budgeting, staffing patterns, and school organization.

Community Representatives

(c) A school committee established under this section shall include community representatives. The community representatives may include business representatives.

TEC Section 21.5511(a)

Essential Skills and Knowledge

(a) The State Board of Education by rule shall establish the essential skills and knowledge that all students should learn to achieve the goals provided under Section 2.01 of this code.

(b) Before adopting rules under this section, the board shall consider the comments of the Legislative Education Board as required under Section 11.24 of this code.

TEC Section 21.5512(a)

Performance-based Assessment

(a) The State Board of Education by rule shall create and implement a statewide assessment program that is primarily performance-based to ensure school accountability for student achievement that achieves the goals provided under Section 2.01 of this code.

TEC Section 14.021(a)

State Board Goals for Technology

(a) The State Board of Education shall develop a long-range plan for:

(1) using technology-based systems for instructional purposes in the classroom;

(2) evaluating, developing, and acquiring computer software for use in the classroom;

(3) fostering computer literacy among public school students so that by the year 2000, all Texas high school graduates will have computer-related competencies that meet standards adopted by the State Board of Education; and

(4) identifying and distributing information on emerging technology for use in the public schools.

Implement the State's Long-Range Plan for Technology

(d) The Central Education Agency shall take actions necessary to implement the long-range plan for technology. The commissioner shall report to the governor annually on the implementation process.

Create a Technology Council

(f) Each school district may create a technology council of persons from the public and private sectors to assist schools in the application and adaptation of technology.

TEC Section 14.041

Purpose

In designing an education system to prepare students for the 21st century, it is the policy of the State of Texas that a quality education system should be available to all students under a thorough and efficient system of education. Under this system, every student must have access to a comprehensive curriculum designed to provide the basis for quality education. Teachers and administrators must be provided technical resources and training to guide the instruction of their students. The conduct and management of the system must be performed in an efficient and economical manner. Educational resources must be devoted to the maximum extent possible to the instruction of students. To accomplish these purposes, public schools must utilize, in a comprehensive manner, appropriate technology in all aspects of instruction, administration, and communication.

Preparing Students for the 21st Century

TEC Section 14.042(a)

(a) The State Board of Education shall establish and maintain an electronic information transfer system that is capable of transmitting information, according to criteria established by the board among school districts, regional education service centers, the Central Education Agency, and other state and education entities the board considers appropriate for participation in the system. The board shall provide the appropriate standards for software and direct the agency to provide training for professional staff in order to reduce paperwork and better manage systems of reporting.

Electronic Information Transfer System (EITS)

(c) The Central Education Agency shall identify model schools and disseminate information on the model schools' technological program development to school districts in all geographic areas of the state.

Identify Model Schools

KEYBOARDING AT THE ELEMENTARY LEVEL

Elementary Technology

The Master Plan for Vocational Education, passed by the Texas State Board of Education, January 11, 1987 states that students will acquire knowledge and skills regarding computer-related competencies (including keyboarding) as appropriate in grades K-6. Therefore, districts must address keyboarding at the elementary level.

Full Implementation by September 1992

During the 1988-89 school year, all districts were required to develop a K-12 plan for technology. This plan should include keyboarding and other elementary computing competencies. Full implementation of this plan is required by September 1992.

Integration Into Curriculum Areas

A district will determine what its keyboarding needs are in its district plan. Keyboarding skills can be integrated into various curriculum areas, such as Language Arts, Science and Social Studies.

COMPUTER LITERACY

There are several reasons, in addition to addressing the goal of technological literacy, for the requirement of Computer Literacy at the middle school level. Reasons for the requirement at this level follow:

Reasons for Computer Literacy

(1) guaranteeing substantial and equal access to technology for all students in Texas regardless of sex, socio-economic background, learning ability, or school district membership;

(2) equipping students with a base of knowledge consistent with their maximum ability that is sufficient to permit intelligent choices among later technology-related study and training;

(3) focusing at the middle school level for maximum teacher accountability, and quality of implementation in technology;

(4) establishing a cadre of teachers, committed to enthusiastically promoting efficient use of current technology for learning among students, teachers, and administrators in education; and

(5) providing a common level of technology-related skills development that can be assumed for each student entering an upper-level course.

More Reasons for Computer Literacy

The Computer Literacy course content will continually evolve, but the course intent should remain the same.

Computer Literacy: An Evolving Course

APPENDIX B:

References and Resources

References

School districts have already received copies of the following publications. Additional copies may be purchased from the Texas Education Agency Publications Office. For further information, call (512) 463-9744.

Handbook on Competitive Bidding for Texas Public Schools	AD0-201-01
Long-Range Plan for Technology of The Texas State Board of Education, 1988-2000	GE9-700-01
Progress Report on the Long-Range Plan for Technology of the State Board of Education	FS1-511-01

Quality, Equity, Accountability: Long-Range Plan for Public Education,1991-1995; Texas State Board of Education (a summary)

References also available from:

International Society for Technology in Education (ISTE)
University of Oregon
1787 Agate Street
Eugene, Oregon 97403-9905

Resources

Resource	Contact	Phone	Page
ACTS - Advisory Committee on Technology Standards	Lane Scott	512-463-9401	10
BETA- Building and Educational Technology Assessment	Debra Haas	512-463-9704	9
DIR - Department of Information Resources	Jerry Johnson Rita Abdeledim Tony Madrè	512-475-4756 512-475-4740 512-475-4730	12
EPIE - Educational Products Information Exchange	Karen Kahan	512-463-9401	10
ESC - Education Service Centers	Robert Scott	512-463-9371	12
GSC General Services Commission (Purchasing Mgr.)	Charlie Bertero	512-463-3363	12
PEIMS-Public Education Information Management	George McCollough	512-463-9800	9
SAC - Software Advisory Committee	Karen Kahan	512-463-9401	10
TCET - Texas Center for Educational Technology	Delia Duffey	512-463-9400	8
TEA - Texas Education Agency Office for Technology	Information Geoff Fletcher	512-463-9734 512-463-9087	11 11
Technology Allotment	Anita Givens	512-463-9401	7
TENET - The Education Network	Connie Stout Richard LaGow Terry Abbott	512-463-9400 512-463-9400 512-463-9400	8
TESS - The Educational Software Selector	Karen Kahan	512-463-9401	10
T-STAR - The Integrated Telecommunications System	Gary Haseloff	512-463-9400	9
Video Programming	Mary Lou Akers	512-463-9400	12
Video Producer	Kate Loughrey	512-463-9400	12

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